

CSC 228 Data Structures and Algorithms, Spring 2020
Instructor: Dr. Natarajan Meghanathan

Assignment 10: Determining the Average Number of Comparisons for a Successful Search and an Unsuccessful Search in a Binary Search Tree based on its Structure Only

Due by: April 7th, 11.59 PM

In this programming assignment, you will develop the code to determine the average number of comparisons for a successful search and for an unsuccessful search in a binary search tree (BST) on the basis of just the structure of the tree.

You are given a code that has the implementation of the binary search tree along with some functions that would be helpful to accomplish the objective of this project.

The main function is written in such a way that it generates BSTs of size 10, 100, 1000, 10000 and 100000. For each of these trees, you will determine and print the average number of comparisons for a successful search and an unsuccessful search.

Submission (in Canvas)

1 - 80 pts) Submit the entire .cpp file including the design and implementation of an algorithm to determine and print the average number of comparisons for a successful and unsuccessful search.

2 - 20 pts) Submit a PDF file that has the following:

- a) A screenshot of the output of your program for the different BST sizes mentioned above.
- b) What would be the theoretically expected number of comparisons for a successful/unsuccessful search in a BST? Justify your answer.
- c) An Excel bar chart that has the BST sizes in the X-axis and the average number of comparisons for successful and unsuccessful searches as well as the theoretically expected number of comparisons in the Y-axis.